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## IDENTITY OF HEUCHERA HISPIDA PURSH<sup>1</sup>

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ON the examination of a large amount of material of the genus *Heuchera*, assembled for the purpose of a monographic treatment, the interesting fact appears that there are no reasonably authentic collections of the species currently passing as *Heuchera hispida* Pursh from farther east than the state of Indiana.<sup>2</sup> Since the type of Pursh's species is stated to have come from the "High mountains of Virginia and Carolina," the complete lack of specimens from the whole intervening region, and even from the "type locality" itself at once aroused suspicion. Upon turning to Pursh's original diagnosis, it became apparent at once that what he named and described as *H. hispida* is an entirely different species from the one which has masqueraded in manuals, floras, and even monographs under that name. In order to point out more readily the misconception regarding the identity of Pursh's species, the original description is quoted in full:

<sup>1</sup> Published with aid of a grant to RHODORA from the National Academy of Sciences.

<sup>2</sup> The only apparent exceptions to this statement are the specimens from Dr. Gray's garden, which will be fully discussed later, and a single specimen now in the herbarium of the Missouri Botanical Garden. The latter, which is one of the middle western forms discussed below appears to have been mounted fairly recently, and bears a large label with "George Engelmann, M.D., St. Louis, Mo." printed, and the name "*Heuchera americana*" apparently in Engelmann's handwriting. It also bears a small and apparently much older label in entirely different handwriting. The data are in almost undecipherable German script, which we interpret as "*Heuchera americana?* Nasswald Meta Ky. Mai 1833." Under the specific name there is pencilled in still a third hand "Richardson?". We cannot pretend to say whether the plant in question really ranges to eastern Kentucky, or whether we have wholly misread the label, or whether perhaps in the obviously long and varied career of the specimen the label may have become mixed.

"*H. hispida*, scabra; scapo petiolis foliisque subtus glabris, foliis acute lobatis, supra hispido-pilosis dentatis: dentibus brevissimis subretusis mucronatis, pedunculis paniculae pauciflorus, calycibus mediocribus subacutis, petalis spathulatis longitudine calycis, staminibus exertis.

On high mountains of Virginia and Carolina ♀, May, June v. v. Petals purple?"<sup>1</sup>

Up to the time of the appearance of Torrey and Gray's *Flora* in 1840, no other collections of *H. hispida*, except the ones by Pursh, were apparently known, for in the comments following the description of the species the statement is found, "We are not aware that this species has been collected by any botanist except Pursh (one of whose specimens is preserved in the herbarium of the late Prof. Barton, and another, a very poor one in that of Mr. Lambert) and perhaps by Rafinesque."

Excerpts from Dr. Gray's later writings reveal his keen interest in this obviously rare species of Pursh for in 1841 in his account of a Botanical excursion to North Carolina we find this footnote: "Much to our disappointment we did not meet with *Heuchera hispida*, although I have since learned from an inspection of Barton's Herbarium, that we passed within moderate distance from the place where Pursh discovered it. The habitat given on the original ticket, 'High mountains between Fincastle and Sweet Springs, and some other similar places,' we here cite, with the hope that it may guide some botanist to its rediscovery."<sup>2</sup>

It is interesting to note that two years later Dr. Gray himself happened to become the rediscoverer of the plant as recounted in a letter written to Dr. Torrey on September 30, 1843 from which the following quotation is taken: "I doubt if I got anything of much interest in Virginia except Buckley's (and Nuttall's) *Andromeda*, *Rhamnus parvifolius* on the waters of Greenbrier, (where did Pursh get it?), *Heuchera pubescens* in fruit and *Heuchera hispida* Pursh!! out of flower and fruit, so that I detected it by the leaves only (and got good roots), not far from where Pursh discovered it, but more west, on the frontiers of a range of mountains where this very local species doubtless abounds."<sup>3</sup>

That Dr. Gray for a number of years regarded *H. hispida* Pursh as a well marked species of very limited range is further evidenced by his comments in 1846 in Silliman's *Journal* where he wrote as follows:

<sup>1</sup> Pursh, Frederick, *Flora Americana Septentrionalis*. 1: 188, 1814.

<sup>2</sup> *Am. Journ. of Sci. and Arts* 42: 16. 1842.

<sup>3</sup> *Letters of Asa Gray* I: 307, 1893.

"In Giles County soon after crossing the river, live roots of the very rare and distinct species *Heuchera hispida* Pursh were obtained which have been preserved in cultivation."<sup>1</sup>

From this cultivation four specimens were prepared and preserved in the Gray Herbarium, which, as will be developed later on, appear to be responsible in large part for the rather startling change of heart Dr. Gray experienced between the years 1846 and 1849 regarding the concept and limited range of the species, for in the latter year we find him making the following unqualified assertion concerning its status: "*Heuchera hispida* Pursh, the rediscovery of which in the mountains of Virginia (in Giles County) I have recorded in Silliman's Journal, second series 1, p. 81, and which I have retained in cultivation in the Cambridge Botanic Garden, is also found in Hancock County, Ill. by Dr. Mead, who has distributed it under the name of *H. Richardsonii* R. Br.; from which indeed, except that it is a larger and more hairy plant, it does not appear to differ."<sup>2</sup>

In accordance with this broadened concept and in direct contrast with the "scapo petiolis foliisque subtus glabris" of the original diagnosis of Pursh, the species is described in the second edition of the Manual (1856)<sup>3</sup> as being *hispid* or *hirsute*, with long spreading hairs (occasionally almost glabrous). The distribution is given as "Mountains of Virginia. Also Illinois (Dr. Mead) and Northwestward." and *H. Richardsonii* R. Br. is cited as synonym. In subsequent editions of the Manual the range is given as Mountains of Va. to N. C., west to Minn. and E. Kan. In the first edition of Britton and Brown's Illustrated Flora (1897) it is recorded from "Virginia to western Ontario, west to Kansas, Manitoba and the Northwest Territory, south in the Rocky Mountains to Montana and Idaho."

In the monographic treatment of the genus in the North American Flora (1905), Dr. Rydberg rescued *H. Richardsonii* R. Br. from synonymy, and gave its distribution as "subarctic America south to Manitoba, Black Hills of South Dakota and British Columbia." The range of *H. hispida* Pursh was accordingly reduced, still it was accorded a generous territory extending "from Ontario to Assiniboia and Wyoming, south to Virginia and Kansas." Finally in the Flora

<sup>1</sup> Silliman's Journal, Second Series 1: 81: 1846.

<sup>2</sup> *Plantae Fendlerianae* 4: 55. 1849.

<sup>3</sup> The name does not appear in the first edition as the plant is wholly outside the geographical range of that work.

of the Prairies and the Plains (1932) the distribution is given as "Ont.—Va.—Kans.—Wyo.—Mont." while that of *H. Richardsonii* has become "Man.—S. D.—B. C."

Nothing is known to the authors concerning the present whereabouts of Pursh's "very poor" specimen which Gray saw in Lambert's Herbarium. If it is still in existence it is undoubtedly the type of the species since it was the plant in Pursh's possession when he drew up his description. However, through the kindness of Dr. Francis W. Pennell we have been able to examine Pursh's other specimen cited by Torrey and Gray. This specimen, formerly in Barton's herbarium, is now at the Academy of Natural Sciences, Philadelphia. This, we believe, can be considered as an authentic specimen of Pursh's species. At least Torrey and Gray, who had seen both specimens did not question their identity. The following data are found on the original ticket in Pursh's handwriting: "Heuchera scabra! P. petalis rubris, floribus majoribus. High mountains between Fin-castle & the Sweet Springs & some other similar places. P." It is to be noted that the name "hispida" does not occur, but "scabra," the second word in Pursh's diagnosis, does, and Pursh does not use this word in the description of any other species of *Heuchera*. What caused Pursh to thus alter the epithet and whether he wrote "*hispida*" in place of "*scabra*" on the specimen in Lambert's herbarium are interesting speculations.

Torrey and Gray, enlarging on Pursh's rather brief description, aptly described *H. hispida* Pursh, and their description is quoted here in full: "scape mostly 1-2 leaved, glabrous; radical leaves roundish-cordate, rather obtusely 5-7 lobed, crenate with very broad and short almost retuse mucronate teeth, hispidly ciliate; the upper surface hispid; the lower with the petioles, glabrous, branches of the panicle few-flowered; petals broadly obovate-spatulate, unguiculate, veiny (violet-purple), somewhat longer than the nearly equal calyx segments, a little shorter than the slightly exserted stamens; styles filiform, at length exserted.—Pursh!"<sup>1</sup>

Further, these authors comment: "Resembles the preceding species [*H. pubescens*]; but the flowers are rather smaller, calyx-segments short obtuse. Limb of the petals undulate toward the apex, very broadly spatulate or somewhat rhomboid." This description is so excellent that our only comments are that we think Pursh's

<sup>1</sup> Fl. N. Am. 1: 579-580. 1840.

“staminibus exertis” states the case more accurately than Torrey and Gray’s “stamens slightly exerted” (the exertion amounts to 2–3.5 mm. and this in so small a flower is scarcely slight), that the styles are rather prominently exerted when the flower is in anthesis, and that the flower is about as regular as any in the genus. As thus defined *Heuchera hispida* Pursh is a very local species of the central Alleghenies. Its nearest relative appears to be *H. Curtisii* T. & G. from which it may be distinguished by its broader, undulate-margined petals, and by the hispid upper surface of its leaves. It is in all respects very different from *H. Richardsonii* R. Br., and from the various middle western forms which have been passing under its name, plants with larger, strongly zygomorphic flowers, and for the most part with much hispid hairiness on all their parts.

A very puzzling situation is presented by the four sheets prepared from the plants grown in the Cambridge garden by Dr. Gray. The tickets on two of them bear the following legend: “*Heuchera hispida* Ph. (1) [or (2)]. The two forms from the same clump. Hort. Cantab. Anno. 1846. e spec Mts. Virg.” All the specimens on sheet No. 1 are true *H. hispida* Pursh, while those on sheet No. 2 are entirely different and clearly belong with the so-called *H. hispida* characteristic of the region from Indiana to Missouri and northward to Minnesota. The other two sheets from the Gray Herbarium are dated 1845. Both bear the statement “Hort. Cantab. ex Virginia.” Both of them contain a mixture of true *Heuchera hispida* and midwestern forms.

How to account for the appearance of the western form in cultivation in the Cambridge garden in the years 1845 and '46 is indeed a puzzle and the most plausible explanation that occurs to the authors is that either live plants or seeds of the Illinois plant must have been sent to Dr. Gray by Dr. Mead. Dr. Mead’s collection was made as early as 1843, the same year that Gray rediscovered *H. hispida* in Virginia, and his specimens contain many ripe seeds. If Dr. Gray planted any of these seeds some may have been washed into the clumps of Virginia plants and have germinated there and *Heucheras* bloom the second year from seed. At any rate it is quite evident that it was the curious mixture of forms in the garden, and the entire similarity of some of them to Mead’s plants which led Gray to expand his conception of *Heuchera hispida* between 1846 and 1849.

All the midwestern plants, which since the publication of *Plantae*

Fendlerianae have been passing as *H. hispida*, appear to belong to *H. Richardsonii* R. Br.<sup>1</sup> This is a rather polymorphic species of wide range in the western prairies and adjacent regions reaching from western Ontario to the Rocky Mountains, and southward to Kansas, Missouri and Indiana. Southward it appears to hybridize pretty freely into other species. *Heuchera Richardsonii* was described from near the northern limit of its range, "on the rocky banks of rivers from latitude 54° to 64° north." This northern form is characterized by having relatively small leaves 2-6 cm. broad, sparingly hispid or nearly glabrous above, usually more copiously hispid below, especially along the veins. The petioles and stems are glandular puberulent and moderately hispid with short (mostly under 1½ mm.) gland-tipped hairs which are usually nearly wanting toward the base of the stem. This is the plant treated by Rydberg<sup>2</sup> as *H. Richardsonii*, and the range which he gives seems to be essentially correct. It is a plant of the Canadian plains occurring eastward into extreme western Ontario, and westward into the Rocky Mountains, along which it runs south as far as Wyoming. It occurs also in the Black Hills, and in a few stations in the extreme northern parts of Minnesota and North Dakota. It may be called appropriately *Heuchera Richardsonii* var. *typica*.<sup>3</sup>

Southwards in the northern plains states a form of this species occurs with larger leaves, 4-8 cm. broad, and much more copious hispid pubescence, with hairs up to 2.5-3.5 mm. in length. It appears to intergrade completely with the typical form, and no consistent floral differences have been discovered. This is the form which throughout its area has been passing as *H. hispida*. It is a clearly marked geographical variant of *H. Richardsonii*, and as such we are giving it the name *Heuchera Richardsonii* var. *hispidior*.<sup>4</sup> This variety ranges from eastern Montana through the Dakotas and Nebraska to Minnesota, western Ontario, western Wisconsin and

<sup>1</sup> Frankl. Journey 766. 1823.

<sup>2</sup> P. A. Rydberg. North American Flora 22: 107, 1905.

<sup>3</sup> HEUCHERA RICHARDSONII var. *typica*. *Heuchera Richardsonii* R. Br., Franklin's Journey p. 766. *sensu stricto*.

We would add as a synonym *H. ciliata* Rydb. Mem. N. Y. Gard. 1: 196, 1900. The floral differences which Rydberg notes as characterizing his species are not significant but occur sporadically in all the forms of the species. Rydberg himself later reduced *H. ciliata* to a synonym of "*H. hispida*" (Flora of the Rocky Mountains and adjacent Plains 382, 1917). The size of leaves, and character of pubescence of his original specimen indicate however that it should be placed here.

<sup>4</sup> HEUCHERA RICHARDSONII var. *hispidior*, var. nov. differt a var. *typica* hujus species foliis majoribus, 4-8 cm. latis, petiolis, caulibusque hispidioribus pilis copiosis albis ad 2.5-3.5 mm. longis. *H. hispida* of authors in part, not *H. hispida* Pursh. TYPE specimen in herb. Minnesota, collected by O. Lakela growing in dry soil, Ft. Snelling, Minn., June 14, 1931.

northern Iowa and throughout most of this range it is the only representative of the genus. A full list of the specimens studied will appear in the forthcoming monograph of the genus.

Still farther south and east, in Illinois, Missouri and the adjacent states another variant appears, marked this time by certain slight peculiarities of the floral characters. The inflorescence is somewhat more open, and the flowers a little smaller, while the stamens are more obviously exserted (about 2-3 times the length of the anthers) and the petals are not only glandular, as they are in all the varieties of the species, but are also minutely papillose. In fruit the capsule is somewhat exserted, which is not true of the other varieties. The pubescence is about as in var. *hispidior*, or in some cases even more dense.

This form is probably of somewhat remote hybrid origin. It has much bad pollen, and it forms the first link in a chain of intergrading forms which connects *H. Richardsonii* var. *hispidior* with the western form of *H. americana*. The disposition of most of these forms is left for the monograph now in process of preparation. On account of the wide geographical range of the form now under consideration, and its relatively small divergence from *H. Richardsonii* var. *hispidior* it seems best to treat it as another variety of *H. Richardsonii*. It is the plant which Mead collected in Illinois in 1843, and the plant whose appearance in Dr. Gray's garden in 1845 and 1846 led to the confusion discussed in the first part of this paper. It therefore seems appropriate to call it *Heuchera Richardsonii* var. *Grayana*.<sup>1</sup> It ranges from Kansas to Indiana and northward to central Wisconsin and southeastern Minnesota. In the northern part of its range it intergrades with *H. Richardsonii* var. *hispidior*.

In conclusion, the middle western plants which have been passing as *Heuchera hispida* Pursh are entirely distinct from that species. They are all varieties of *H. Richardsonii* R. Br. These varieties are briefly distinguished in the following key:

1. Capsules included, stamens barely exserted, petals glandular but not papillose
  - a. Flowering scapes and petioles moderately hispid with short (1.5 mm. and less) hairs. Leaves 2-6 cm. broad.....*H. Richardsonii* var. *typica*.

<sup>1</sup> *HEUCHERA RICHARDSONII* var. **Grayana**, var. nov. floribus 7-9 mm. longis, petalis et glanduliferis et papillosis, staminibus 2-3 plo longitudine antherarum exsertis, capsulis breve exsertis. *Heuchera hispida*, Gray, *Plantae Fendlerianae* 4: 55, 1849, as to the western forms there discussed and in part of many later American authors, not *H. hispida* Pursh. TYPE specimen in the herbarium of the Missouri Botanical Garden, collected by S. B. Mead at Augusta, Ill. May 1843.

- b. Flowering scapes and petioles densely hispid with long (2-3.5 mm.) hairs. Leaves 4-8 cm. broad. *H. Richardsonii* var. *hispidior*.
2. Capsules more or less exserted, stamens obviously exserted, petals both glandular and papillose . . . . . *H. Richardsonii* var. *Grayana*.

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## HEUCHERA HISPIDA PURSH REDISCOVERED<sup>1</sup>

EDGAR T. WHERRY

DURING the year 1805 Frederick Pursh collected plants in the Appalachian mountain region of Virginia and West Virginia, a number of which were described as new species in his *Flora Americae Septentrionalis*, which appeared 9 years later. Among these was a *Heuchera hispida*, stated to have the leaves hispid above but glabrous beneath, the peduncles glabrous, and the flowers medium-sized with purple petals and exserted stamens.<sup>2</sup> Through misunderstanding, subsequent authors came to apply this name to a western plant having the peduncles and lower leaf-surfaces more hispid than the upper surfaces. This situation was recognized in the course of a revision of the genus undertaken at the University of Minnesota by Miss Olga Lakela and Professors Rosendahl and Butters,<sup>3</sup> but on borrowing material from various herbaria they were unable to find a specimen corresponding to Pursh's description in any subsequent collection, except a few of material grown by Gray from roots collected in Giles County, Virginia, in 1843. A Pursh specimen of *H. hispida* is fortunately preserved, however, in the herbarium of the Academy of Natural Sciences of Philadelphia, and the label gives its place of collection as "high mountains between Fincastle & the Sweet Springs." On being advised of these facts in the Spring of 1932, the writer decided to endeavor to rediscover the plant, and as soon as the term's class work was over started on a trip, in company with Professor S. C. Palmer of Swarthmore College.

Leaving Swarthmore, Pennsylvania, on June 9th, we made several stops to collect plants en route, and reached Fincastle, Botetourt County, Virginia, in the afternoon of June 12th. Continuing north-

<sup>1</sup> Contribution from the Botanical Laboratory of the University of Pennsylvania. This account of the incidents of the trip supersedes any which has appeared in newspapers and popular magazines.

<sup>2</sup> *Flora Americae Septentrionalis* 1: 188. 1814.

<sup>3</sup> Cf. the preceding article.